CHAPTER 8 EXISTING INSTALLATIONS: MINIATURE BOILERS

800 MAXIMUM ALLOWABLE WORKING PRESSURE

800.1 The maximum allowable working pressure on the shell of a boiler or drum shall be determined by the formula:

$$\frac{TS \times t \times E}{R \times FS} =$$ Maximum allowable working pressure in pounds per square inch.

where

TS = ultimate tensile strength of shell plates, pounds per square inch.
t = minimum thickness of shell plate in weakest course, in inches.
E = efficiency of longitudinal joint, as per paragraph P-181, A.S.M.E. Code.
E = efficiency for tube ligaments between openings as calculated by paragraph P-192 and 193, A.S.M.E. Code.
R = inside radius of the weakest course of the shell or drum in inches.
FS = factor of safety allowed by these rules.

800.2 To be used as given in §800.1 for longitudinal joints, riveted construction, or if for fusion welded joints, E shall be taken as specified in paragraph P-102 A.S.M.E. Code. In any case where there are both riveted joints and tube ligaments to consider, the weaker of these shall be used for E.

801 PARTS AND EQUIPMENT

801.1 Each miniature boiler operating at a pressure in excess of twenty-five (25) pounds per square inch shall be provided with at least one feed pump or other approved feeding device except where the steam generator is operated with no extraction of steam (closed system). In the latter case, in lieu of a feeding device, a suitable connection or opening, not less than one-half inch (1/2") pipe size, shall be provided to fill the generator when cold.

801.2 Each miniature boiler shall be fitted with feed water and blow-off connections which shall not be less than one-half inch (1/2") iron pipe size unless operated on a closed system. The feed pipe shall be provided with a check valve and stop valve. The blow-off shall be fitted with a valve or cock in direct connection with the lowest water space practicable. When the boiler is under pressure, feed water shall not be introduced through the openings or connections used for the column, the water gage glass or gage cocks. All valves, pipe fittings, and appliances shall be at least one hundred twenty five (125) pounds standard.

801.3 Each miniature boiler shall be equipped with a water gage glass and one or more gage cocks. The lowest permissible water level shall be at a point one-third of the height of the shell except where the boiler is equipped with internal furnace, when it shall be not less than one-third of the length of the tube above the top of the furnace. In the case of small generating units operated on the closed system, where there is insufficient space for the usual water gage, water-level indicators of the glass bull's eye type may be used.

801.4 Each miniature boiler shall be equipped with a steam gage having its dial graduated to not less than one and one-half times the maximum allowable working pressure. The gage shall be connected to the steam space or to the steam connection to the water column by a brass or bronze composition siphon tube or equivalent device that will keep the gage tube filled with water.

801.5 Each boiler shall be equipped with a sealed, spring loaded pop safety valve not less than one-half inch (1/2") diameter connected directly to the boiler. To insure the safety valve being free each valve shall have a substantially lifting device by which the valve disk may be lifted from its seat when there is at least seventy-five percent (75%) of full working pressure in the boiler. All safety valves shall be mounted with their spindles vertical and freely accessible.

801.6 The safety valve shall be plainly marked by the manufacturer with the following information:

(a) His or her name or identifying trade-mark;

(b) The nominal diameter;

(c) The steam pressure at which it is set to blow; and

(d) The capacity in pounds and A.S.M.E. Std.

801.7 The minimum relieving capacity for the safety valve shall be determined on the basis of three (3) pounds of steam per hour per square foot of heating surface and shall be sufficient to discharge all the steam that can be generated by the boiler without allowing the pressures to rise more than six percent (6%) above the maximum allowable working pressure.

801.8 Each steam line from a boiler shall be provided with a one hundred twenty-five (125) pound standard stop valve located as close to the boiler shell or drum as is practicable.

801.9 Each boiler shall be provided with a blow-off connection which shall not be reduced in size and shall be led to a safe point of discharge. Whenever, in the judgment of the boiler inspector, such a place cannot be provided, a blow-down tank shall be provided on all such tanks. The blow-off shall be fitted with a valve or cock in direct connection with the lowest water space practicable.

801.10 Each boiler mechanically fired other than by gas shall be provided with an automatic low-water fuel cut-out so located as to automatically cut off the fuel supply in case the water level falls to a point not lower than the bottom of the water glass.

801.11 Where boilers are gas-fired, the burners used shall conform to the requirements of the American Gas Association. The burner shall in those cases be equipped with a fuel-regulating governor which shall be automatic and regulated by the steam pressure. The governor shall be so constructed that in the event of its failure, there can be no possibility of steam from the boiler entering the gas chamber or supply pipe. A manual stop cock or throttle valve shall in all cases be located in the inlet pipe ahead of the fuel-regulating governor.

801.12 Each gas-fired boiler shall be equipped with a four inch (4") vent of flue extended to an approved location outside of the building or connected to a chimney, all to be in accordance with the D.C. Building Code. Where the horizontal run is more than ten feet (10'), the vent shall be increased to six inches (6")

801.13 All boiler replacements shall conform to the rules and regulations governing new installations.

801.14 Each retubed boiler must be inspected and passed by the boiler inspector before the boiler is again put in service. The annual inspection fee will be charged for this inspection.

801.15 Each used boiler brought into the District of Columbia shall be inspected by the boiler inspector before being installed.

801.16 Moving a boiler and reinstating it in the same or another building shall require an installation permit.